

**INTRAVENOUS LIPID EMULSION FOR THE TREATMENT OF
PERMETHRIN TOXICOSIS IN CATS**

by

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I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary institution.

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Abstract

Over the last decade, a growing interest has emerged in the use of intravenous lipid emulsions in the treatment of lipophilic drug toxicoses. Initial interest in the therapy was prompted by its successful use in rats and dogs for reversing the life-threatening cardiovascular effects of local anaesthetic overdoses. A postulated mechanism of action of intravenous lipid emulsion in lipophilic drug toxicoses is lipid partitioning, which is creation of an intravascular lipid compartment into which lipophilic drugs may be bound and sequestered away from their sites of action. Permethrin is a highly lipophilic insecticide which can cause significant morbidity and mortality in cats through its neuroexcitatory effects. Permethrin is a common ingredient in flea treatments marketed for dogs and accidental administration to cats is common. The aims of this study were to (1) determine if a lipid emulsion added to permethrin-containing feline plasma *in vitro* would lead to a decrease in plasma permethrin concentration thus supporting a lipid sink effect, and (2) assess the clinical response to intravenous lipid emulsion administration in cats with permethrin toxicosis. In the *in vitro* study, addition of a lipid emulsion to permethrin-containing feline plasma led to a significant reduction in plasma permethrin concentration within 30 minutes. In the clinical trial, there was a significant difference in the distribution of clinical stages over time between treatment groups, with cats receiving 20% intravenous lipid emulsion having lower clinical stages earlier than cats receiving the saline control. The results of these studies support the use of intravenous lipid emulsion in the treatment of permethrin toxicosis in cats and the *in vitro* study supports intravascular lipid partitioning as a mechanism of action. Future research is needed to confirm lipid partitioning as a mechanism of action of intravenous lipid emulsion *in vivo* for lipophilic drug toxicoses, determine the metabolic fate of lipid sequestered drugs and

ascertain adverse effects of intravenous lipid emulsion at the doses recommended for drug toxicoses.

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TABLE OF CONTENTS

Chapter 1: Use of intravenous lipid emulsion for lipophilic drug toxicoses excluding local anaesthetics	1
Background	1
Method.....	1
Results	3
Use of intravenous lipid emulsion in specific toxicoses.....	3
Proposed mechanisms of action of intravenous lipid emulsion for drug toxicoses	35
Intravenous lipid emulsion formulations.....	40
Intravenous lipid emulsion dose	41
Adverse effects of intravenous lipid emulsions.....	42
Conclusions	46
References.....	46
Chapter 2: Permethrin toxicosis in cats	53
Chapter 3: Summary and hypothesis for present study	57
Chapter 4: Sequestration of permethrin into lipid emulsion; an <i>in vitro</i> feline plasma model	58
Introduction	58
Methods	59
Results	62
Discussion.....	64
Conclusions	66
Footnotes	67
References.....	67
Chapter 5: A randomized controlled clinical trial of an intravenous lipid emulsion as an adjunctive treatment for permethrin toxicosis in cats	70
Introduction	70
Materials and Methods.....	71
Results	76
Discussion.....	80
Conclusion	85
Footnotes	85
References.....	85
Chapter 6: Conclusion	90
Appendix 1: Raw data for <i>in vitro</i> experiment.....	91

Appendix 2: Raw data for validation of permethrin toxicosis clinical staging system ...	92
Appendix 3: Raw data for clinical trial	93
Bibliography	100